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(54) Water collection tray

(57) A water collection tray, for use in the collection of water in vapour cycle refrigeration systems, the tray having a dished centre portion 2, a hole located in the upper face of a frusto-conical projection above the level of the dished centre portion and below the level of an edge portion 4 of the tray, projecting support portions 5 in an upper face of the tray, and indented locating portions 6 in a lower face of the tray. The dished centre portion 2, support portions 5, and locating portions 6 are pressed from a single sheet of material. In a first orientation the support portions of a first tray coincide with the locating portions of a second tray which is positioned above the first tray (as shown), and in a second orientation the upper face of the first tray and the lower face of the second tray coincide. The hole is located such that when in the first orientation the holes of adjacent trays are not vertically aligned.

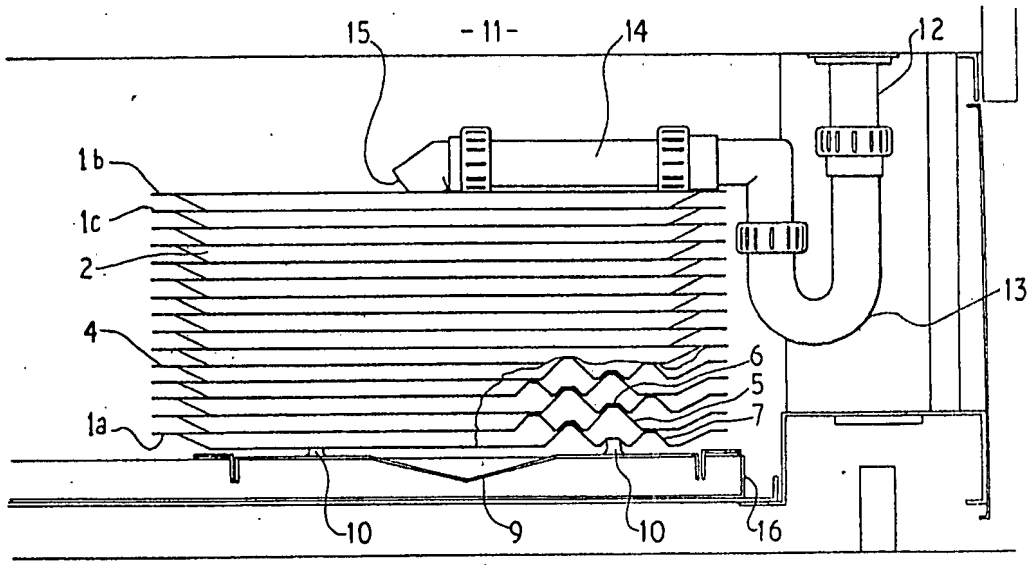

FIG.5.

The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy.

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FIG.3

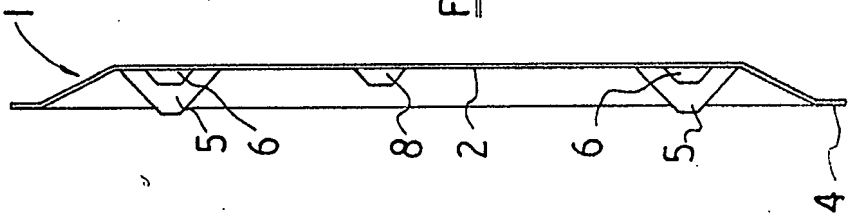


FIG. 1.

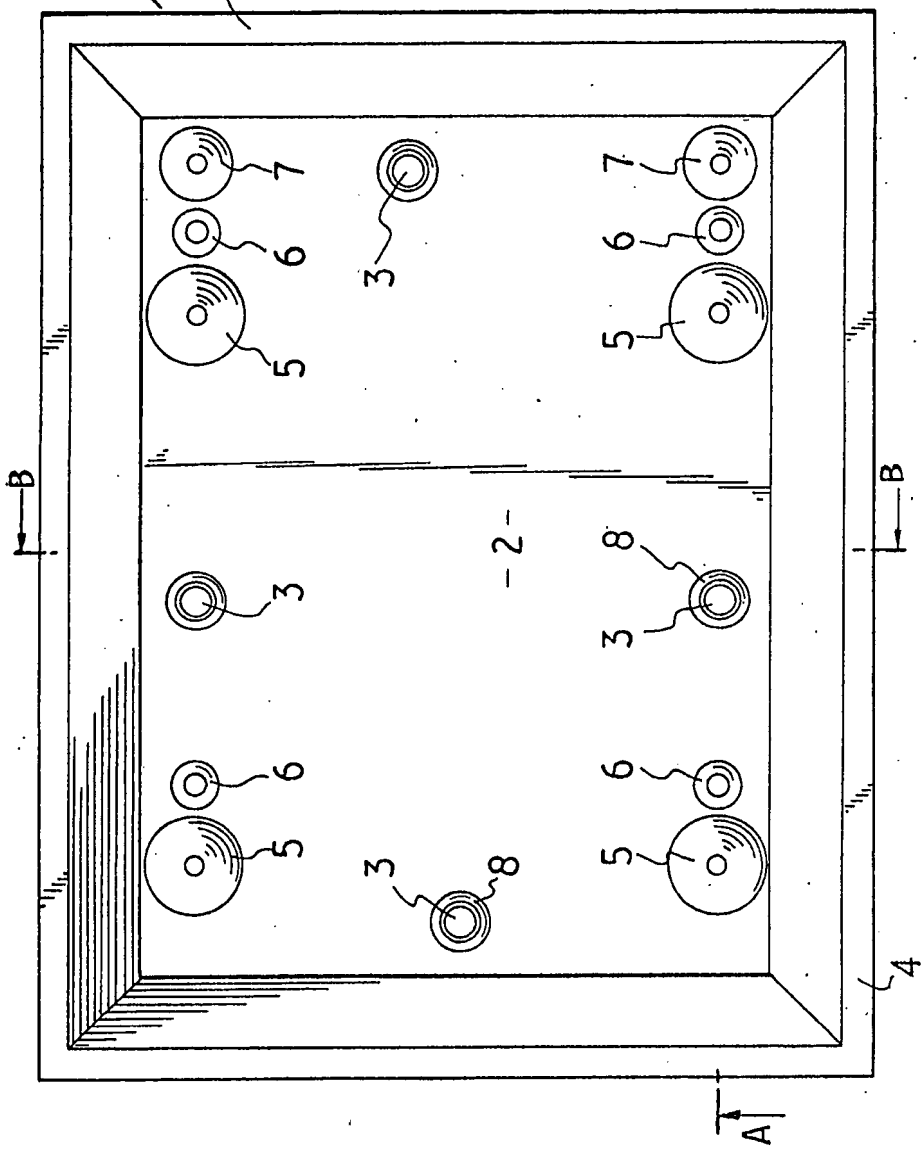
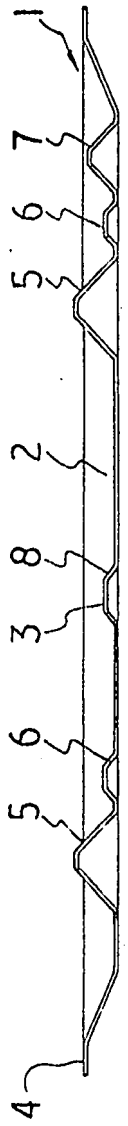


FIG. 2.



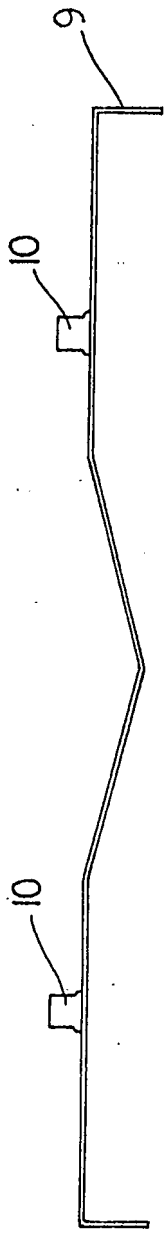


FIG.4

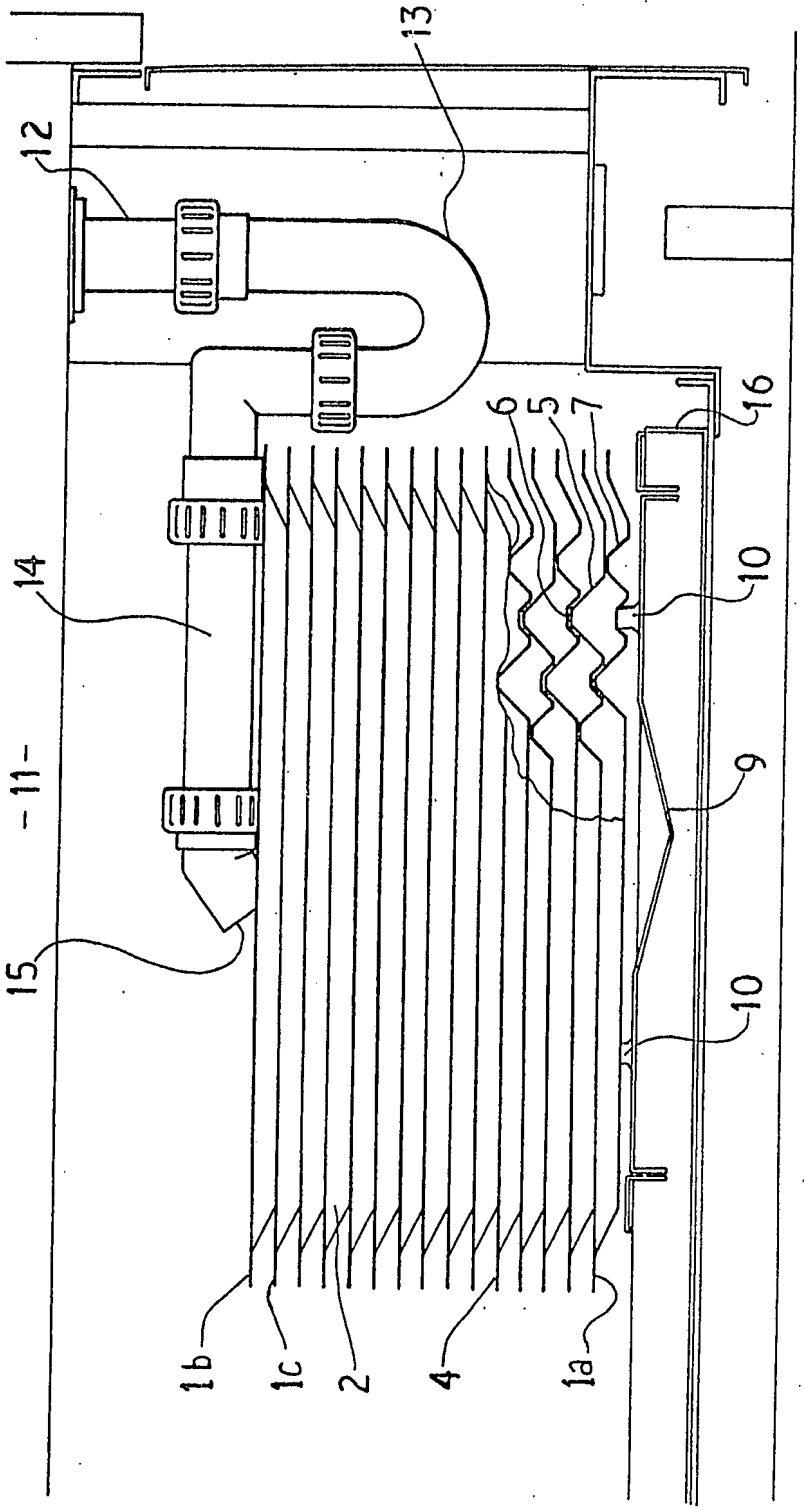


FIG.5.

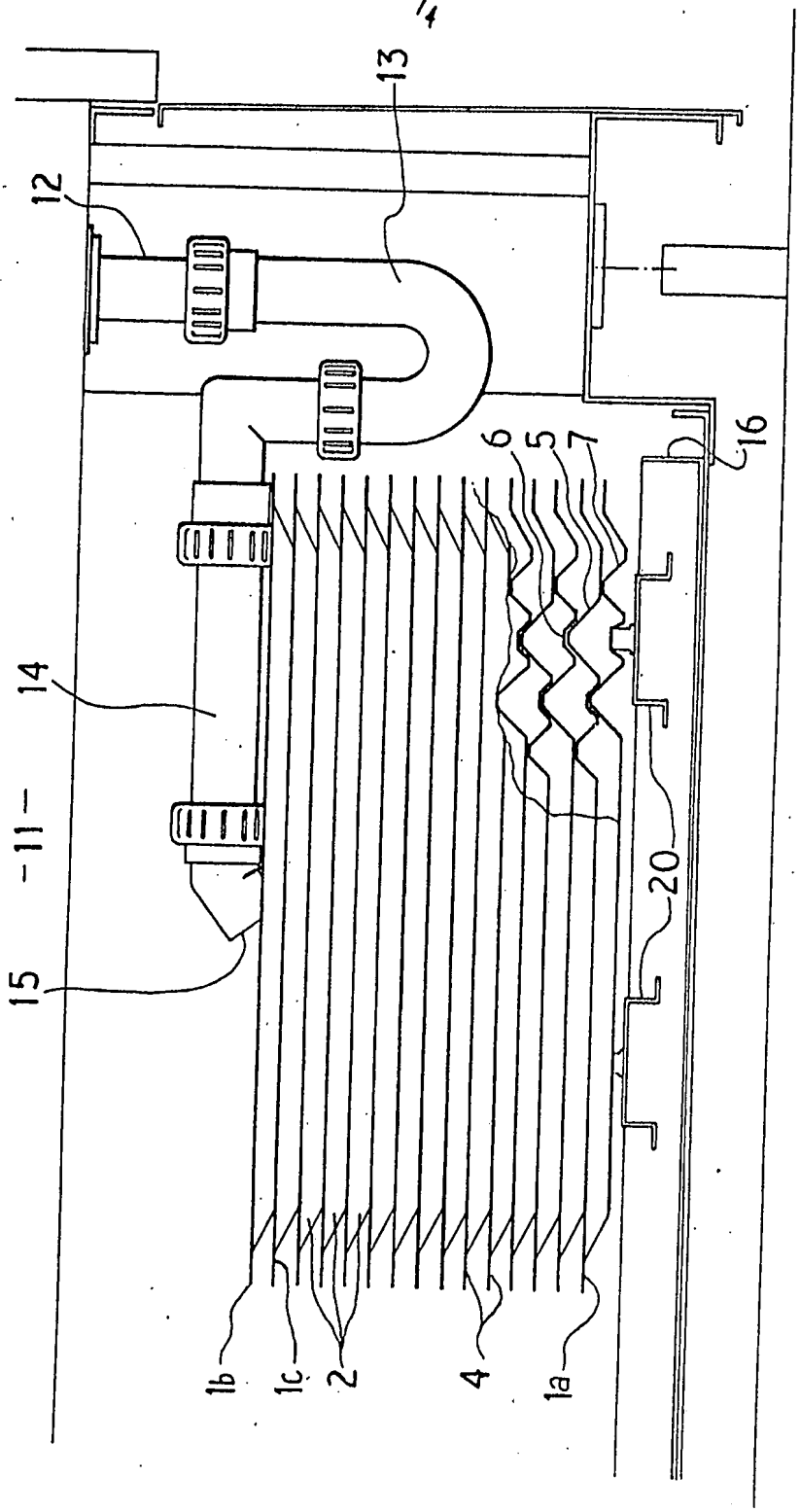


FIG.6.

SPECIFICATION

Water collection tray

This invention relates to a water collection tray.

The invention has particular application in the collection and disposal of water which collects in vapour cycle refrigeration systems.

Vapour cycle refrigeration systems comprises a compressor, a motor to drive the compressor, a condenser, a fan which creates an air flow over the condenser to improve its efficiency, an expansion system and an evaporator. The evaporator is normally in communication with a cooled chamber in which, for example, foodstuffs may be stored.

In our UK Patent No 1,460,450 a refrigeration system is described wherein the water which collects in the system during operation drains to a plurality of water collecting trays through which the water cascades.

The trays are located in the path of the air flow generated by the fan, the air having been warmed by passage over the condenser, so that the water in the trays is evaporated.

The trays described in UK Patent No 1,460,450 are of aluminium alloy and are retained in superimposed relationships by rods, passing through apertures in the trays, acting as spacers maintaining the trays in spaced apart positions.

In use, this system has been shown to work efficiently, the water collecting in the trays being evaporated quickly and effectively. However, the continual passage of air over the trays leads to a gradual build-up of dust and dirt on the surface of the trays. In many vapour cycle refrigeration systems, particularly those associated with the storage of foodstuffs, this build-up is unacceptable and, therefore, the trays must be removed periodically from the system to be cleaned. Removal of the trays involves dismantling part of the system and hence the system must be taken out of use while the trays are being cleaned. Clearly, this situation is undesirable and to some extent defeats the original purpose of the system, which was to reduce maintenance by obviating the need to collect and remove water manually from refrigeration systems.

According to the present invention, there is provided a water collection tray, for use in the collection of water in vapour cycle refrigeration systems, having a dished centre portion, a hole located above the level of the dished centre portion and below the level of an edge portion of the tray, projecting support portions in an upper face of the tray, and indented locating portions in a lower face of the tray; in a first orientation the support portions of a first tray coincide with the locating portions of a second tray which is positioned above the first tray, and in a second orientation the upper face of the first tray and the lower face of the second tray coincide.

Preferably, the dished centre portion, support portions, and locating portions are pressed from a single sheet of material.

Preferably also, the tray is substantially rectangular in plan form and has support and locating portions in each corner portion.

Preferably also, the hole is formed in the upper face of a raised portion of the dished centre portion.

Preferably also, the hole is located such that when in the first orientation the holes of adjacent trays are not vertically aligned.

Preferably also, portions are provided to abut and support the lower face of the dished centre portion of a second tray when the trays are in the first orientation.

Preferably also, in the first orientation adjacent trays are displaced by 180° to one another.

The trays may be of a material that preferably does not distort or deteriorate with heat or with the weight of water deposition.

Embodiments of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a plan view of a tray in accordance with the present invention;

Figure 2 is a sectional view on line A–A of Fig. 1;

Figure 3 is a sectional view of line B–B of Fig. 1;

Figure 4 is an end view of a mounting means for a stack of trays in accordance with the present invention;

Figure 5 is a part cut-away side view of a portion of a cabinet having a vapour cycle refrigeration system showing a stack of trays and the mounting means of Fig. 4; and,

Figure 6 is a part cut-away side view of a portion of a cabinet having a vapour cycle refrigeration system showing a stack of trays and an alternative mounting means.

Referring to Figs. 1 to 5 of the drawings, a water collection tray 1, for use in the collection of water in vapour cycle refrigeration systems, has a dished centre portion 2, four drain holes 3 located above the level of the dished centre portion 2 and below the level of an edge portion 4 of the tray 1, projecting support portions 5 in an upper face of the tray 1, and indented locating portions 6 in a lower face of the tray 1.

The tray 1 is rectangular in plan view and is formed by pressing the shape of the tray 1 from a planar sheet of material. Four support portions 5 in the form of truncated cones, extend upwardly from the corner portion of the dished centre portion 2 and project above the edge portion 4. The support portions 5 are located asymetrically on either side of a centre line B of the tray 1, such that when the trays are displaced by 180° to one another the upper portion of each support

portion 5 is received by a corresponding indented locating portion 6 of a vertically adjacent tray 1.

Abutting portions 7 of frustoconical form are provided in the upper face of the tray 1 to abut and support the lower face of the dished centre portion 2 of a vertically adjacent tray 1 when the trays 1 are displaced by 180°. The top faces of the abutting portions 7 are level with their own tray edge 4.

The drain holes 3 are located near the edge of the dished centre portion 2 and are in the upper face of fustoconical projections 8. The drain holes 3 are situated such that, when the trays 1 are displaced 180° to one another, the holes 3 of adjacent trays 1 in a stack will be out of alignment.

A stack of trays 1 is mounted, on means 9 provided with self anchoring nuts 10 which are received by the locating portions 6 of the lowermost tray 1a, in the lower portion of a refrigerated cabinet 11, as shown in Fig. 5 of the drawings. Water which collects in the cabinet 11 drains into an outlet pipe 12. The outlet pipe 12 is provided with a U-bend 13 to form a water trap and a trap arm 14 which has an outlet 15 located above the uppermost tray 1b of the stack.

The water from the outlet 15 drips into the uppermost tray 1b where it collects until the water level rises to the level of the drain holes 3 at the top of the frustoconical projections 8, and then drains through the drain holes 3 into the next tray 1c in the stack. In this manner, the water cascades through to the lower trays 1 of the stack.

The stack is located so as to be in the path of a warm air flow generated by fan means of the refrigeration system, the air being warmed by passage over a compressor of the system. A tray 1 retains water as a shallow body with a large surface area; when in contact with a heated air stream, rapid evaporation of the water therefore takes place. In the unlikely event that the water is not evaporated before reaching the lowermost tray 1a of the stack, the mounting means 9 are located in a collection tray 16.

To remove the trays 1 from the cabinet for cleaning, the trap arm 14 is swung through 90° and the trays lifted out. As the trays 1 support one another and require no mechanical fixing means, the removal and replacement of the trays 1 may be carried out without tools and in a relatively short time.

Furthermore, for storage and transportation, the trays 1 may be closely stacked as the support, locating and abutting portions 5, 6 and 7 only cooperate to space the trays 1 when adjacent trays are displaced by 180°.

Fig. 6 of the drawings shows an alternative mounting means 20.

Modifications and improvements may be incorporated without departing from the scope of the invention.

CLAIMS

1. A water collection tray, for use in the collection of water in vapour cycle refrigeration systems, having a dished centre portion, a hole located above the level of the dished centre portion and below the level of an edge portion of the tray, projecting support portions in an upper face of the tray, and indented locating portions in a lower face of the tray; in a first orientation the support portions of a first tray coincide with the locating portions of a second tray which is positioned above the first tray, and in a second orientation the upper face of the first tray and the lower face of the second tray coincide.

2. A tray as claimed in Claim 1, wherein the dished centre portion, support portions, and locating portions are pressed from a single sheet of material.

3. A tray as claimed in in either Claim 1 or 2, wherein the plan form is substantially rectangular with support and locating portions in each corner portion.

4. A tray as claimed in any one of the preceding Claims, wherein the hole is in the upper face of a raised region of the dished centre portion.

5. A tray as claimed in any one of the preceding Claims, wherein the hole is located such that when in the first orientation the holes of adjacent trays are not vertically aligned.

6. A tray as claimed in any one of the preceding Claims, wherein portions are provided to abut and support the lower face of the dished centre portion of a second tray when the trays are in the first orientation.

7. A tray as claimed in any one of the preceding Claims, wherein in the first orientation adjacent trays are displaced by 180° to one another.

8. A water collection tray substantially as hereinbefore described with reference to the accompanying drawings.

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NAME	COUNTRY
BARKER GEORGE & CO LTD	N/A

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US-CL-CURRENT: 62/285

ABSTRACT:

A **water collection** tray, for use in the collection of water in vapour cycle refrigeration systems, the tray having a dished centre portion 2, a hole located in the upper face of a **frusto-conical** projection above the level of the dished centre portion and below the level of an edge portion 4 of the tray, projecting support portions 5 in an upper face of the tray, and indented locating portions 6 in a lower face of the tray. The dished centre portion 2, support portions 5, and locating portions 6 are pressed from a single sheet of

material. In a first orientation the support portions of a first tray coincide
with the locating portions of a second tray which is positioned above the first
tray (as shown), and in a second orientation the upper face of the first tray
and the lower face of the second tray coincide. The hole is located such that
when in the first orientation the holes of adjacent trays are not vertically
aligned. <IMAGE>